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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/746,064	12/26/2000	Mizuhisa Nihei	001701	1990

7590 12/06/2001

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 12/06/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/746,064

Applicant(s)
Nihei et al.

Examiner
Bradley Baumeister

Art Unit
2815



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Dec 26, 2000
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoo '442. Yoo discloses a FET having a gate with dielectric oxide layer 4 at the interface to the surface of the semiconductor 1. The oxide may be composed of, among other materials, TiO₃ or ZrO₃ (col. 4, lines 52-).

3. Claims 1, 3, 5-7 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Kirchner et al. '450. Kirchner discloses MESFETs having a gallium oxide insulating layer. See e.g., FIG 9 wherein the gallium oxide is also interposed under the S/D regions and FIG 10 wherein the oxide covers the entire surface.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by or in the alternative under 35 U.S.C. 103(a) as being unpatentable over Kirchner et al. '450 as applied to the claims above.

a. Regarding claim 4, Kirchner sets forth the stoichiometric composition of Ga_2O_3 (e.g., col. 3, line 27) and also generally sets forth the composition as gallium oxide. One of ordinary skill in the art would understand the latter, general recitation to be generic to both stoichiometric and non-stoichiometric compositions. Alternatively, assuming *arguendo* that the reference must be interpreted so narrowly as not setting forth non-stoichiometric compositions, it nonetheless would have been obvious to one of ordinary skill in the art at the time of the invention that given the disclosure of gallium oxide to alternatively employ non-stoichiometric gallium oxide, depending on various conventional considerations such as whether the oxidation time is altered. The use of non-stoichiometric GaO_x does not lead to any unexpected results.

b. Regarding claim 8, Kirchner sets forth that the invention is applicable to MESFETs, MOSFETs and also metal FET structures (e.g., ABSTRACT). A HEMT is a metal FET structure, so this specific structure is included within this generic recitation. Alternatively, assuming *arguendo* that the reference must be interpreted so narrowly as not addressing HEMTs, it nonetheless would have been obvious to one of ordinary skill in the art at the time of the

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invention to employ the GaOx gate insulator in a HEMT for the purpose of controlling the Fermi level pinning as taught by Kirchner (e.g., col. 2, lines 1-12).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

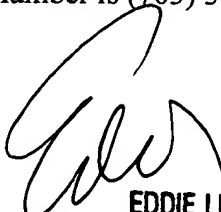
a. Shimakura et al. '003 discloses MESFETs employing aluminum oxide gate insulators (e.g., col. 2, line 16).

INFORMATION ON HOW TO CONTACT THE USPTO

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

B. William Baumeister

December 2, 2001


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